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Excitation of Alfven waves by a spiraling ion beam in the Large Plasma Device[1] SHREEKRISHNA TRIPATHI, BART VAN COMPERNOLLE, WALTER GEKELMAN, PATRICK PRIBYL, Physics and Astronomy, UCLA, WILLIAM HEIDBRINK, Physics and Astronomy, UCI, TROY CARTER, Physics and Astronomy, UCLA — A hydrogen ion beam (15 kV, 10 A) has been obliquely injected from the end of the Large Plasma Device (LAPD) into a large magnetoplasma ($n \approx 10^{12}$ cm^{-3}, $T_e \approx 4$ eV, B = 1.0 - 1.8 kG, 19 m long, 0.6 m diam) for performing fusion-relevant fast-ion studies. The beam was produced using a recently upgraded ion source that utilizes a hot-cathode LaB_6 plasma source and a multi-aperture three-grid beam-extractor. Measurements of the beam profiles at multiple axial locations (up to 18 m distance from the source) have evinced a spiraling ion-beam (current-density $\approx$ 60 mA/cm^2, pitch angle in the plasma $\approx 53^\circ$) that propagates with an Alfvenic speed (beam speed/Alfven speed = 0.5 - 1.2). Although the beam generates other waves, we will focus on the spontaneous generation of shear Alfven waves by the beam. To investigate the role of the resonant wave-particle interaction, an Alfven wave in the direction of the beam propagation was launched from an antenna. The ratio of beam-speed to wave phase-speed was varied. Initial results demonstrate spatial growth of the launched wave under suitable conditions for the resonant wave particle interaction.

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